Abstract Submitted to the
International Conference on Strongly Correlated Electron Systems
University of Michigan, Ann Arbor
August 6-10, 2001

Intermixing of Fe at Cu(1)-chain and Cu(2)-plane sites in $FeSr_2YCu_2O_{7.30}$: A neutron diffraction study

V.P.S. Awana[1], S.K. Malik[2], W.B. Yelon[3], J. Nakamura[1], J. Lindén[4], M. Karppinen[*1], H. Yamauchi[1]

[1] *Tokyo Institute of Technology, Yokohama 226-8503, Japan*
[2] *Tata Institute of Fundamental Research, Mumbai 400005 India*
[3] *University of Missouri-Rolla, MO 65409, USA*
[4] *Department of Physics, Åbo Akademi, FIN-20500 Turku, Finland*

A single-phase $FeSr_2YCu_2O_z$ (Fe-1212) compound has been synthesized through a solid-state reaction route. This compound crystallizes in a tetragonal structure (space group $P4/mmm$). Rietveld structural refinement of the room-temperature neutron diffraction data reveals that nearly half of Fe remains at the Cu(1)-chain site while other half goes to the Cu(2)-plane site in the standard $Cu(1)Sr_2YCu(2)_2O_7$ or Cu-1212 structure. In the resulting stoichiometeric compound, Cu is also distributed over the chain and plane sites appropriately. Oxygen content of the compound, as determined from the oxygen occupancies, is 7.30(2) per formula unit. Existence of Fe in two different coordination numbers at the Cu(1) and Cu(2) sites is also confirmed from room temperature Mössbauer spectrum of the compound. Resistivity measurements performed for $FeSr_2YCu_2O_{7.30}$ down to a temperature of 5 K, show an onset of superconductivity transition at around 70 K. Field-cooled (FC) and zero-field-cooled (ZFC) magnetizations, measured in an applied field of 5 Oe, also show branching at around 70 K.

[*]Also at Helsinki University of Technology, FIN-02015 Espoo, Finland